

REMARKS

Reexamination and reconsideration of the present application are requested.

Applicants have amended claims 2, 5-7 and 12-13 for clarification, and added new claims 14 and 15. Accordingly, claims 1-15 remain pending in the application.

CLAIM OBJECTIONS

The Office Action objected to claims 4-6 and 11-13.

Applicants respectfully traverse those objections for at least the following reasons.

Applicants respectfully submit that claims 4-6 and 11-13 all properly further limit the subject matter of their antecedent claims. For example, claim 4 recites that the brush arm moves in a direction parallel to the linear orientation of the first injector. The cleaning device of claim 1 includes no such limitation. That is, it is possible that in a device according to claim 1, the brush arm may not move in a direction parallel to a linear orientation of the first injector, whereas in a device according to claim 4, the brush arm must move in a direction parallel to a linear orientation of the first injector. Thus, claim 4 further limits the subject matter of claim 1. Similarly, claims 5, 6 and 11-13 all further limit the subject matter of their respective antecedent claims.

Meanwhile, the specification provides ample support for the features of claims 4-6 and 11-13. The specification clearly and specifically teaches that the brush can move between the center and edge of the wafer based on a horizontal movement of the brush arm, and can remain in contact with, or at an appropriate distance from the surface of the wafer, based on the vertical movement of the brush arm (paragraph 25). The specification also teaches that "it is preferable that the brush 50 moves horizontally in a direction parallel to the first injector 61."

The Office Action states that the claims and specification "do not disclose means for how the movement is to be accomplished." Applicants respectfully submit that is irrelevant. In FIG. 4, for example, it is the feature of a brush arm exhibiting

movement in a direction parallel to a linear orientation of the first injector that is being claimed, not the means for accomplishing that movement. Once the benefit of a brush arm exhibiting such movement is discovered and claimed (as it has been by Applicants), it is a relatively routine matter to provide the means to accomplish such movement. Such means (e.g., a motor) are conventional and well known and require no explanation.

Therefore, Applicants respectfully submit that all of the claims 4-6 and 11-13 further limit the subject matter of their antecedent claims.

Accordingly, Applicants respectfully request that the Examiner withdraw the objections to claims 4-6 and 11-13.

35 U.S.C. § 112

The Office Action rejected claim 7 under 35 U.S.C. § 112.

Applicants have amended claim 7 for clarification.

Accordingly, it is respectfully submitted that the rejection of claim 7 under 35 U.S.C. § 112 has been overcome.

35 U.S.C. § 102

The Office Action rejected: claims 1-7 under 35 U.S.C. § 102 over Konishi et al. U.S. Patent 6,385,805 (“Konishi”); claims 1, 2 and 5-7 under 35 U.S.C. § 102 over Maekawa et al. U.S. Patent 5,868,866 (“Maekawa”); claims 1-8 and 10-13 under 35 U.S.C. § 102 over Nishimura et al. U.S. Patent 5,829,087 (“Nishimura ‘087”); and claims 1-8 and 10-13 under 35 U.S.C. § 102 over Nishimura et al. U.S. Patent 6,286,525 (“Nishimura ‘525”).

Applicants respectfully traverse those rejections for at least the following reasons.

Konishi

Claim 1

Among other things, the device of claim 1 includes a second injector disposed

adjacent to the brush along one side of the brush arm.

Applicants respectfully submit that Konishi does not disclose a device having this feature.

① { The Office Action fails to make any mention at all of the claim feature that the second injector is disposed "along one side of the brush arm." The Office Action has identified element 53 as supposedly corresponding to the second injector and element 33 as supposedly corresponding to the recited brush arm. Inspection of FIGs. 2-4, cited in the Office Action, shows that the "second injector" 53 is not disposed along one side of the brush arm 33. }

② { Furthermore, the device of claim 1 includes a brush that cleans the wafer during horizontal movement between a center and edges of the wafer. }

③ { Applicants respectfully submit that the cited FIGs. 2-4 in Konishi do not disclose a device having this feature. The Office Action has failed to cite anything in Konishi allegedly disclosing such a feature. In that regard, Applicants respectfully submit that the brush 31 of Konishi moves in an arc, and in any event, only moves at all to place it into a working position. Applicants see no teaching in Konishi that the brush 31 actually cleans the wafer during any horizontal movement. }

The above features being deemed more than sufficient to distinguish the device of claim 1 from Konishi, Applicants do not deem it necessary at this time to address all of the other distinctions between the device of claim 1 and Konishi.

Accordingly, for at least these reasons, Applicants respectfully submit that claim 1 is patentable over Konishi.

Claims 2-7

Claims 2-7 depend from claim 1 and are deemed patentable over Konishi for at least the reasons set forth above with respect to claim 1, and for the following additional reasons.

Claim 3

④ { Among other things, in the device of claim 3, the first injector is arranged to be perpendicular to the second injector. }

④ Applicants respectfully submit that Konishi does not disclose a device having this feature.

The Office Action states FIG. 2 of Konishi indicates that "at some point in the operation the first injector may be perpendicular to the second injector."

⑤ Applicants respectfully submit that "may be" cannot sustain a rejection under 35 U.S.C. § 102. Indeed, it appears that FIG. 2 shows that the injectors/arms 43a and 53a are parallel to each other in a working position, and also parallel to each other in a home position. So it would appear that the first injector is arranged to be parallel to the second injector under all conditions. Applicants see nothing in Konishi that discloses (the true standard under 35 U.S.C. § 102) or even suggests that the first injector is arranged to be perpendicular to the second injector.

If the Examiner believes that Konishi actually discloses that the first injector is ever arranged to be perpendicular to the second injector (as opposed to "may be"), then Applicants respectfully request a citation to such a disclosure. Otherwise, Applicants respectfully request that the Examiner withdraw the rejection of claim 3 under 35 U.S.C. § 102 based on Konishi.

Accordingly, for at least these additional reasons, Applicants respectfully submit that claim 3 is patentable over Konishi.

Claim 7

Among other things, in the device of claim 7 the brush moves perpendicularly with respect to a direction along which the first injector extends.

Applicants respectfully submit that Konishi does not disclose a device having this feature. The Office Action states Konishi discloses such a feature in FIG. 3.

Applicants respectfully disagree. FIG. 3 indicates that the brush 31 moves in an arc from a home position to a working position. This can be even more clearly seen in FIG. 2. The brush 31, pivoting by the support pole 34 does not move perpendicularly with respect to a direction along which the first injector 43a extends.

Accordingly, for at least these additional reasons, Applicants respectfully submit that claim 7 is patentable over Konishi.

Maekawa

Claim 1

Among other things, the device of claim 1 includes a second injector disposed adjacent to the brush along one side of the brush arm.

Applicants respectfully submit that Maekawa does not disclose a device having this feature.

The Office Action fails to make any mention at all of the claim feature that the second injector is disposed "along one side of the brush arm." The Examiner has identified element 20a as supposedly corresponding to the second injector and element 32 as supposedly corresponding to the recited brush arm. Inspection of FIG. 2, cited in the Office Action, shows that the "second injector" 20a is not disposed along one side of the brush arm 32.]

Also, the device of claim 1 includes a brush that cleans the wafer during horizontal movement between a center and edges of the wafer.

Applicants respectfully submit that Maekawa does not disclose a device having this feature.

At the outset, Applicants respectfully submit that Maekawa teaches that element 34 is a "sponge" rather than a brush (col. 4, lines 52-56). Furthermore, Applicants respectfully submit that the sponge 34 moves in an arc, and does not appear to move between a center and edges of the wafer. Indeed, from inspection of FIG. 2, it would appear that the sponge 34 cannot move to an edge of the wafer as it would be impeded by the clamping member 11. Applicants see no teaching in Maekawa that the sponge 34 cleans the wafer during horizontal movement between a center and edges of the wafer.

If the Examiner believes that Maekawa actually discloses such a feature, then Applicants respectfully request a citation to such a disclosure. Otherwise, Applicants respectfully request that the Examiner withdraw the rejection of claim 1 under 35 U.S.C. § 102 based on Maekawa.

Furthermore, in the device of claim 1, the first injector ejects the pure water

toward the center of the wafer.

The Office Action fails to make any mention at all of the claim feature that the first injector ejects the pure water toward the center of the wafer. If the Examiner believes that Maekawa actually discloses such a feature, then Applicants respectfully request a citation to such a disclosure. Otherwise, Applicants respectfully request that the Examiner withdraw the rejection of claim 1 under 35 U.S.C. § 102 based on Maekawa.

The above features being deemed more than sufficient to distinguish the device of claim 1 from Maekawa, Applicants do not deem it necessary at this time to address all of the other distinctions between the device of claim 1 and Maekawa.

Accordingly, for at least these reasons, Applicants respectfully submit that claim 1 is patentable over Maekawa.

Claims 2 and 5-7

Claims 2-7 depend from claim 1 and are deemed patentable over Maekawa for at least the reasons set forth above with respect to claim 1, and for the following additional reasons.

Claim 7

Among other things, in the device of claim 7 the brush moves perpendicularly with respect to a direction along which the first injector extends.

Applicants respectfully submit that Maekawa does not disclose a device having this feature.

FIG. 2 of Maekawa shows the first injector 20 pointing downward toward the wafer while the sponge 34 moves in an arc over the wafer.

Furthermore, the Office Action fails to make any mention at all of the claim feature that the brush moves perpendicularly with respect to a direction along which the first injector extends. If the Examiner believes that Maekawa actually discloses such a feature, then Applicants respectfully request a citation to such a disclosure. Otherwise, Applicants respectfully request that the Examiner withdraw the rejection of claim 7 under 35 U.S.C. § 102 based on Maekawa.

Accordingly, for at least these additional reasons, Applicants respectfully submit that claim 7 is patentable over Maekawa.

Nishimura '087

Claim 1

Among other things, the device of claim 1 includes a second injector disposed adjacent to the brush along one side of the brush arm.

Applicants respectfully submit that Nishimura '087 does not disclose a device having this feature.

The Office Action fails to make any mention at all of the claim feature that the second injector is disposed "along one side of the brush arm." The Office Action has identified element 6 as supposedly corresponding to the second injector and element 7 as supposedly corresponding to the recited brush arm. Inspection of FIG. 2, cited in the Office Action, clearly shows that the "second injector" 6 is not disposed along one side of the brush arm 7.

Furthermore, in the device of claim 1, the first injector ejects the pure water toward the center of the wafer.

The Office Action fails to make any mention at all of the claim feature that the first injector ejects the pure water toward the center of the wafer. If the Examiner believes that Nishimura '087 actually discloses such a feature, then Applicants respectfully request a citation to such a disclosure. Otherwise, Applicants respectfully request that the Examiner withdraw the rejection of claim 1 under 35 U.S.C. § 102 based on Nishimura '087.

The above features being deemed more than sufficient to distinguish the device of claim 1 from Nishimura '087, Applicants do not deem it necessary at this time to address the other distinctions between the device of claim 1 and Nishimura '087.

Accordingly, for at least these reasons, Applicants respectfully submit that claim 1 is patentable over Nishimura '087.

Claims 2-7

Claims 2-7 depend from claim 1 and are deemed patentable over Nishimura

'087 for at least the reasons set forth above with respect to claim 1, and for the following additional reasons.

Claim 2

Among other things, in the device of claim 2, the second nozzle is arranged to be perpendicular to a top surface of the wafer. Inspection of FIG. 1 of Nishimura '087 shows that such a feature is not present in the device of Nishimura '087.

Accordingly, for at least these additional reasons, Applicants respectfully submit that claim 2 is patentable over Nishimura '087.

Claim 3

Among other things, in the device of claim 3, the first injector is arranged to be perpendicular to the second injector.

Applicants respectfully submit that Nishimura '087 does not disclose a device having this feature.

The Office Action states that in FIG. 2 of Nishimura '087, the rightmost upper injector "appears to be" perpendicular to the leftmost lower injector.

At the outset, Applicants respectfully submit that "appears to be" cannot sustain a rejection under 35 U.S.C. § 102. Furthermore, such does not at all "appear to be" the case to Applicants. If one were to take the time to get out a straightedge and extend the lines along which the rightmost upper injector and the leftmost lower injector of Nishimura '087 extends, one would see that they are very clearly not perpendicular, or even very close to perpendicular.

Accordingly, for at least these additional reasons, Applicants respectfully submit that claim 3 is patentable over Nishimura '087.

Claim 4

Among other things, in the device of claim 4, the brush arm moves in a direction parallel to linear orientation of the first injector. Inspection of FIG. 2 of Nishimura '087 shows that such a feature is not present in the device of Nishimura '087.

Furthermore, the Office Action fails to make any mention at all of this feature.

If the Examiner believes that Nishimura '087 actually discloses such a feature, then Applicants respectfully request a citation to such a disclosure. Otherwise, Applicants respectfully request that the Examiner withdraw the rejection of claim 4 under 35 U.S.C. § 102 based on Nishimura '087.

Accordingly, for at least these additional reasons, Applicants respectfully submit that claim 4 is patentable over Nishimura '087.

Claim 7

Among other things, in the device of claim 7 the brush moves perpendicularly with respect to a direction along which the first injector extends.

Applicants respectfully submit that Nishimura '087 does not disclose a device having this feature.

FIG. 2 of Nishimura '087 shows that the brush 8 does not move perpendicularly with respect to a direction along which the first injector (upper cluster 6) extends.

Accordingly, for at least these additional reasons, Applicants respectfully submit that claim 7 is patentable over Nishimura '087.

Claim 8

Among other things, in the device of claim 8, the second injectors include a plurality of pipe lines formed along a circumference of the brush arm.

Applicants respectfully submit that Nishimura '087 does not disclose a device having this feature.

Indeed, the Office Action fails to make any mention at all of the feature that a plurality of pipe lines is formed along a circumference of the brush arm. If the Examiner believes that Nishimura '087 actually discloses such a feature, then Applicants respectfully request a citation to such a disclosure. Otherwise, Applicants respectfully request that the Examiner withdraw the rejection of claim 8 under 35 U.S.C. § 102 based on Nishimura '087.

Accordingly, for at least these reasons, Applicants respectfully submit that claim 8 is patentable over Nishimura '087.

Claims 10-13

Claims 10-13 depend from claim 8 and are deemed patentable over Nishimura '087 for at least the reasons set forth above with respect to claim 8, and for the following additional reasons.

Claim 10

Among other things, in the device of claim 10, the first injector is arranged to be perpendicular to the plurality of second injectors.

As explained above with respect to claim 3, Applicants respectfully submit that Nishimura '087 does not disclose a device having this feature. Indeed, the rightmost upper injector and the leftmost lower injector of Nishimura '087 are not even very close to perpendicular.

Accordingly, for at least these additional reasons, Applicants respectfully submit that claim 10 is patentable over Nishimura '087.

Claim 11

Among other things, in the device of claim 11, the brush arm moves in a direction parallel to linear orientation of the first injector. Inspection of FIG. 2 of Nishimura '087 shows that such a feature is not present in the device of Nishimura '087.

Furthermore, the Office Action fails to make any mention at all of this feature. If the Examiner believes that Nishimura '087 actually discloses such a feature, then Applicants respectfully request a citation to such a disclosure. Otherwise, Applicants respectfully request that the Examiner withdraw the rejection of claim 11 under 35 U.S.C. § 102 based on Nishimura '087.

Accordingly, for at least these additional reasons, Applicants respectfully submit that claim 11 is patentable over Nishimura '087.

Nishimura '525

Claim 1

Among other things, the device of claim 1 includes a second injector disposed adjacent to the brush along one side of the brush arm.

Applicants respectfully submit that Nishimura '525 does not disclose a device having this feature.

The Office Action fails to make any mention at all of the claim feature that the second injector is disposed "along one side of the brush arm." The Office Action has identified element 6 as supposedly corresponding to the second injector and element 7 as supposedly corresponding to the recited brush arm. Inspection of FIG. 2, cited in the Office Action, clearly shows that the "second injector" 6 is not disposed along one side of the brush arm 7.

Furthermore, in the device of claim 1, the first injector ejects the pure water toward the center of the wafer.

The Office Action fails to make any mention at all of the claim feature that the first injector ejects the pure water toward the center of the wafer. If the Examiner believes that Nishimura '525 actually discloses such a feature, then Applicants respectfully request a citation to such a disclosure. Otherwise, Applicants respectfully request that the Examiner withdraw the rejection of claim 1 under 35 U.S.C. § 102 based on Nishimura '525.

The above features being deemed more than sufficient to distinguish the device of claim 1 from Nishimura '525, for brevity Applicants do not deem it necessary at this time to address all of the other distinctions between the device of claim 1 and Nishimura '525.

Accordingly, for at least these reasons, Applicants respectfully submit that claim 1 is patentable over Nishimura '525.

Claims 2-7

Claims 2-7 depend from claim 1 and are deemed patentable over Nishimura '525 for at least the reasons set forth above with respect to claim 1, and for the following additional reasons.

Claim 2

Among other things, in the device of claim 2, the second nozzle is arranged to be perpendicular to a top surface of the wafer. Inspection of FIG. 1 of Nishimura

'525 shows that such a feature is not present in the device of Nishimura '525.

Accordingly, for at least these additional reasons, Applicants respectfully submit that claim 2 is patentable over Nishimura '525.

Claim 4

Among other things, in the device of claim 4, the brush arm moves in a direction parallel to linear orientation of the first injector. Inspection of FIG. 2 of Nishimura '525 shows that such a feature is not present in the device of Nishimura '525.

Furthermore, the Office Action fails to make any mention at all of this feature. If the Examiner believes that Nishimura '525 actually discloses such a feature, then Applicants respectfully request a citation to such a disclosure. Otherwise, Applicants respectfully request that the Examiner withdraw the rejection of claim 4 under 35 U.S.C. § 102 based on Nishimura '525.

Accordingly, for at least these additional reasons, Applicants respectfully submit that claim 4 is patentable over Nishimura '525.

Claim 7

Among other things, in the device of claim 7 the brush moves perpendicularly with respect to a direction along which the first injector extends.

Applicants respectfully submit that Nishimura '087 does not disclose a device having this feature.

FIG. 2 of Nishimura '525 shows that the brush 8 does not move perpendicularly with respect to a direction along which the first injector (upper cluster 6) extends.

Accordingly, for at least these additional reasons, Applicants respectfully submit that claim 7 is patentable over Nishimura '525.

Claim 8

Among other things, in the device of claim 8, the second injectors include a plurality of pipe lines formed along a circumference of the brush arm.

Applicants respectfully submit that Nishimura '525 does not disclose a device

having this feature.

Indeed, in the rejection of claim 8 under 35 U.S.C. § 102 over Nishimura '525, the Office Action fails to make any mention at all of the feature that a plurality of pipe lines is formed along a circumference of the brush arm. If the Examiner believes that Nishimura '525 actually discloses such a feature, then Applicants respectfully request a citation to such a disclosure. Otherwise, Applicants respectfully request that the Examiner withdraw the rejection of claim 8 under 35 U.S.C. § 102 based on Nishimura '525.

Accordingly, for at least these reasons, Applicants respectfully submit that claim 8 is patentable over Nishimura '525.

Claims 10-13

Claims 10-13 depend from claim 8 and are deemed patentable over Nishimura '525 for at least the reasons set forth above with respect to claim 8, and for the following additional reasons.

Claim 11

Among other things, in the device of claim 11, the brush arm moves in a direction parallel to linear orientation of the first injector. Inspection of FIG. 2 of Nishimura '525 shows that such a feature is not present in the device of Nishimura '525.

Furthermore, the Office Action fails to make any mention at all of this feature. If the Examiner believes that Nishimura '525 actually discloses such a feature, then Applicants respectfully request a citation to such a disclosure. Otherwise, Applicants respectfully request that the Examiner withdraw the rejection of claim 11 under 35 U.S.C. § 102 based on Nishimura '525.

Accordingly, for at least these additional reasons, Applicants respectfully submit that claim 11 is patentable over Nishimura '525.

35 U.S.C. § 103

The Office Action rejected claims 8-9 and 11-13 under 35 U.S.C. § 103 over

Nishimura '525.

Applicants respectfully traverse those rejections for at least the following reasons.

Claim 8

Among other things, in the device of claim 8, the second injectors include a plurality of pipe lines formed along a circumference of the brush arm.

Applicants respectfully submit that Nishimura '525 does not disclose a device having this feature.

In rejecting claim 8 under 35 U.S.C. § 103 over Nishimura '525, the Office Action cites the embodiment of FIG. 9 of Nishimura '525. However, Nishimura '525 clearly teaches that the second embodiment “includes, **in place of the cleaning brushes 8** of the first embodiment, a plurality of high-pressure cleaning nozzles” (col. 7, lines 55-64 (emphasis added)). Therefore, there being no brush in FIG. 9, there can also be no brush arm, or any injectors comprising a plurality of pipe lines formed along a circumference of a brush arm.

Accordingly, Nishimura '525 neither discloses nor suggests any cleaning device including a brush that cleans the wafer, a brush arm that supports and moves the brush, and second injectors comprising a plurality of pipe lines formed along a circumference of the brush arm.

Incidentally, although Nishimura '525 appears to indicate that the support arm 7 has pipings 21a and 21b formed within, the Office Action fails to cite anything in Nishimura '525 that discloses or suggests that a plurality of pipe lines formed along a circumference of the support arm 7.

Accordingly, for at least these reasons, Applicants respectfully submit that claim 8 is patentable over Nishimura '525 under 35 U.S.C. § 103.

Claims 9 and 11-13

Claims 9 and 11-13 depend from claim 8 and are deemed patentable over Nishimura '525 for at least the reasons set forth above with respect to claim 8, and for the following additional reasons.

Claim 9

In the device of claim 9, the plurality of second injectors are tightly fixed to the brush arm by a fixing apparatus.

As noted above, Nishimura '525 clearly teaches that the second embodiment includes a plurality of high-pressure cleaning nozzles **in place of the cleaning brushes** of the first embodiment. Therefore, there being no brush arm in FIG. 9, the pipes 21 and 21a cannot be fixed to a brush arm.

Incidentally, although Nishimura '525 appears to indicate that the support arm 7 has pipings 21a and 21b formed within, the Office Action fails to cite anything in Nishimura '525 that discloses or suggests that a plurality of pipe lines are fixed to the support arm 7 by a fixing apparatus.

Accordingly, Nishimura '525 neither discloses nor suggests any cleaning device wherein a plurality of second injectors are tightly fixed to a brush arm by a fixing apparatus.

Claim 11

Among other things, in the device of claim 11, the brush arm moves in a direction parallel to linear orientation of the first injector. Inspection of FIGs. 2 and 9 of Nishimura '525 shows that such a feature is not present in either embodiment of the device of Nishimura '525.

Furthermore, the Office Action fails to make any mention at all of this feature. If the Examiner believes that Nishimura '525 actually discloses such a feature, then Applicants respectfully request a citation to such a disclosure. Otherwise, Applicants respectfully request that the Examiner withdraw the rejection of claim 11 under 35 U.S.C. § 102 based on Nishimura '525.

Accordingly, for at least these additional reasons, Applicants respectfully submit that claim 11 is patentable over Nishimura '525.

NEW CLAIMS 14 AND 15

New claims 14 and 15 are deemed patentable over the art of record for at least

the reasons set forth above with respect to claims 1 and 8 from which they respectively depend. Furthermore, Applicants respectfully submit that none of the cited prior art discloses devices having all of the recited features of claims 14 and 15, including a first injector that extends along a radial direction from an edge of the wafer toward the center of the wafer, and ejects the pure water onto a central portion of the wafer.

CONCLUSION


In view of the foregoing explanations, Applicants respectfully request that the Examiner reconsider and reexamine the present application, allow claims 1-15, and pass the application to issue. In the event that there are any outstanding matters remaining in the present application, the Examiner is invited to contact Kenneth D. Springer (Reg. No. 39,843) at (703) 715-0870 to discuss these matters.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 50-0238 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17, particularly extension of time fees.

Respectfully submitted,

VOLENTINE FRANCOS, P.L.L.C.

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By: 
Kenneth D. Springer
Registration No. 39,843

VOLENTINE FRANCOS, P.L.L.C.
12200 Sunrise Valley Drive, Suite 150
Reston, Virginia 20191
Telephone No.: (703) 715-0870
Facsimile No.: (703) 715-0877